What is claimed is:

1. A motor having an output shaft movable in multiple degrees of freedom, the motor comprising:

a stator having an interior curved surface;

a first stator coil and a second stator coil wound in close proximity to the interior surface, but not extending inward of the interior curved surface, the first stator coil and the second stator coil positioned substantially orthogonally to each other; and

a rotor fixed to the output shaft and movably supported adjacent the interior surface of the stator with an air gap disposed between the rotor and the stator, the rotor including at least one magnet disposed thereon and being movable along the interior surface in directions defining at least a first and a second degree of freedom;

wherein upon energization of the first stator coil a first magnetic field is established to urge the rotor to rotate in a direction of the first degree of freedom, and upon energization of the second stator coil a second magnetic field is established to urge the rotor to rotate in a direction of the second degree of freedom, the second degree of freedom substantially perpendicular to the first degree of freedom.

2. The motor of claim 1, wherein the first degree of freedom is substantially perpendicular to a longitudinal axis of wires of one of the first and second coils associated with the first degree of freedom and the second degree of freedom is

substantially perpendicular to a longitudinal axis of wires of the other of the first and second coils.

3. The motor of claim 1, wherein the curved interior surface is defined by a stator back iron comprising a ferromagnetic material.

4. The motor of claim 1, wherein the interior curved surface defines at least a portion of a sphere.

5. The motor of claim 1, wherein the curved interior surface is uniformly curved.

6. The motor of claim 1, wherein the at least one magnet is a permanent magnet.

7. The motor of claim 1, wherein the rotor includes a plurality of the magnets disposed thereon, and wherein each of the plurality of magnets forms a different side of a parallelogram with first and third ones of the magnets defining a first pair of parallel sides of the parallelogram which are substantially parallel to the first stator coil, and second and fourth ones of the magnets defining a second pair of parallel sides of the parallelogram which are substantially parallel to the second stator coil.

8. The motor of claim 7, wherein the parallelogram is a square.

9. The motor of claim 7, wherein the first and second ones of the magnets are configured with south poles disposed adjacent the stator coils and the third and fourth ones of the magnets are configured with north poles disposed adjacent the stator coils.

10. The motor of claim 1, wherein the rotor is supported adjacent the stator by a gimbal mechanism connected to the output shaft and supported on the stator.

11. The motor of claim 10, wherein the gimbal mechanism is configured to establish pivot points for the output shaft to allow motion of the rotor in the first and second degrees for freedom, the pivot points being aligned with an equator of the curved surface.

12. The motor of claim 1, wherein the output shaft is an input shaft.

13. The motor of claim 12, further comprising a sensor for detecting movement of the input shaft.

14. A motor having an output shaft movable in multiple degrees of freedom, the motor comprising:

a stator, the stator having an interior surface and first and second stator coils wound in close proximity to the interior surface, the stator coils positioned substantially orthogonally to each other, the stator comprising a plurality of laminations, the laminations radially disposed about a center point with a plane of each lamination extending through the center point; and

a rotor fixed to the output shaft and movably supported adjacent the stator with an air gap disposed between the rotor and the stator, the rotor including at least one magnet disposed thereon and being movable along the interior surface in directions defining at least first and second degrees of freedom.

15. The motor of claim 14, whereupon energization of the first stator coil a first magnetic field is established to urge the output shaft to rotate in a first plane, and upon energization of the second stator coil a second magnetic field is established to urge the output shaft to rotate in a second plane substantially orthogonal to the first.

16. The motor of claim 14, wherein each lamination comprises an arcuate surface perpendicular to the plane of the lamination.

17. The motor of claim 14, wherein each lamination comprises a wedge shape when viewed parallel to a longitudinal axis of the output shaft.

18. The motor claim of claim 14, wherein each lamination comprises a pair of parallel sides.

19. The motor claim of 18, wherein the laminations are separated by spacers to space the laminations more along an outside surface of the stator than along the interior surface of the stator.

20. The motor of claim 14, wherein the output shaft is an input shaft.

21. The motor of claim 18, further comprising a sensor for detecting movement of the input shaft.

22. A motor having an output shaft movable in multiple degrees of freedom, the motor comprising:

a first stator, the first stator having an interior curved surface and a first stator coil, a second stator coil, and a third stator coil, the stator coils wound in close proximity to the interior surface;

a second stator, the second stator having an interior curved surface and a fourth stator coil, a fifth stator coil, and a sixth stator coil, the stator coils wound in close proximity to the interior surface;

a commutation system capable of changing the distribution of current in the first, second, third, fourth, fifth, and sixth coils to provide a desired force at each output shaft position; and

a rotor fixed to the output shaft and movably supported adjacent the first stator and the second stator with an air gap disposed between the rotor and the stators, the rotor including at least one magnet disposed thereon and being movable along the interior surfaces in directions defining at least first and second degrees of freedom.

23. The motor of claim 22, wherein the first stator is positioned substantially perpendicular to the second stator.

24. The motor of claim 23, wherein upon energization of one or more of the first, second, or third stator coils a first magnetic field is established to urge the rotor to rotate in a direction of the first degree of freedom, and upon energization of one or more of the fourth, fifth, or sixth stator coils a second magnetic field is established to urge the rotor to rotate in a direction of the second degree of freedom, the second degree of freedom substantially perpendicular to the first degree of freedom.

25. The motor of claim 22, wherein the output shaft is an input shaft.

26. The motor of claim 25, further comprising a sensor for detecting movement of the input shaft.

27. The motor of claim 22, wherein the first stator comprises a first plurality of parallel laminations and the second stator comprises a second plurality of parallel laminations positioned in an arc about a center point, the first plurality arranged perpendicular to the second plurality.

28. The motor of claim 27, wherein each lamination comprises a plurality of parallel slots.

29. The motor of claim 28, wherein the parallel slots are perpendicular to a longitudinal axis of the output shaft when the output shaft is in a neutral position.

30. The motor of claim 27, wherein the first and second plurality of laminations comprise a plurality of identical laminations.

31. The motor of claim 27, wherein each lamination comprises an interior surface having an arcuate face, the arcuate face being orthogonal to a side surface of

each lamination.

32. The motor of claim 27, wherein the first plurality of parallel laminations forms a stepped concave surface about a longitudinal axis of the output shaft in a plane orthogonal to the side surface of the plurality of laminations.

33. The motor of claim 22, wherein the first, second, and third coils are wound around the stator such that they overlap each other.

34. The motor of claim 22, wherein the first, second, and third coils are coupled to and driven by a poly-phase power supply.

35. A lamination for use in a stator, comprising:

a ferromagnetic material having an arcuate surface orthogonal to a first side surface and a plurality of parallel slots.

36. The lamination of claim 35, further comprising a second side surface parallel to the first side surface.

37. The lamination of claim 35, further comprising a second side surface not parallel to the first side surface.

38. A ferromagnetic lamination for use in a stator, comprising:

an arcuate surface orthogonal to a side surface;

a plurality of non-uniform spreaders adjacent the arcuate surface; and

a plurality of slots extending from the spreaders away from the arcuate surface.

39. The ferromagnetic lamination of claim 38, wherein each of the slots are parallel to each other.

40. The ferromagnetic lamination of claim 38, wherein the arcuate surface conforms to a partial semi-circle having a center point.

41. The ferromagnetic lamination of claim 40, wherein each of the slots are aligned along a radial axis extending through the center point.

42. A ferromagnetic lamination for use in a stator, comprising:

an arcuate surface orthogonal to a side surface;

a plurality of uniform spreaders adjacent the arcuate surface; and

a plurality of radially extending slots extending from the spreaders away from the arcuate surface.

43. A motor having an output shaft movable in multiple degrees of freedom, the motor comprising:

a first stator portion and a second stator portion, each stator portion having a plurality of laminations, each lamination having an arcuate surface orthogonal to a side surface, a plurality of non-uniform spreaders adjacent the arcuate surface, and a plurality of slots extending from the spreaders away from the arcuate surface, each stator portion having a coil wound in close proximity to the arcuate surface, the first stator portion positioned substantially orthogonal to the second stator portion; and

a rotor fixed to the output shaft and movably supported adjacent the stator with an air gap disposed between the rotor and the stator, the rotor including at least one magnet disposed thereon and being movable along the interior surface in directions defining at least first and second degrees of freedom,

wherein upon energization of the first stator coil a first magnetic field is established to urge the rotor to rotate in a direction of the first degree of freedom, and upon energization of the second stator coil a second magnetic field is established to urge the rotor to rotate in a direction of the second degree of freedom, the second degree of freedom substantially perpendicular to the first degree of freedom.

44. The motor of claim 43, wherein each of the laminations in the first stator portion are parallel to each other.

45. The motor of claim 43, wherein the laminations are radially disposed about a center point with a plane of each lamination extending through the center point.

46. A method of providing force feedback to an output shaft of a motor, comprising the steps of:

providing a first stator having a first interior curved surface and a first, a second, and a third stator coil wound in close proximity to the first interior surface, the first, the second, and the third stator coils overlapping each other;

providing a rotor fixed to the output shaft and movably supported adjacent the first interior surface of the first stator with an air gap disposed between the rotor and the first stator, the rotor being movable along the interior surfaces in a direction defining a first degree of freedom; and

energizing at least one of the first, the second, and the third stator coils to urge the rotor to rotate in a direction of a first degree of freedom.

47. The method of claim 46, further comprising the step of energizing at least two of the first, the second, and the third stator coils to urge the rotor to rotate in a direction of the first degree of freedom.

48. The method of claim 46, changing a distribution of current in the first, second, and third stator coils to provide a desired force at each output shaft position.

49. The method of claim 46, further comprising the step of providing a second stator having a second interior curved surface and a fourth, a fifth, and a sixth stator coil wound in close proximity to the interior surface of the second stator.

50. The method of claim 49, further comprising the step of energizing at least two of the fourth, fifth, and the sixth stator coils to urge the rotor to rotate in a direction of a second degree of freedom.

51. The method of claim 49, further comprising the step of changing a distribution of current in the fourth, fifth, and the sixth stator coils to provide a desired force at each output shaft position.